CLAIMS

I claim:

1. A catadioptric light distribution system comprising:

a light emitting diode (LED) having an optical axis and capable of emitting light in an essentially hemispherical pattern distributed 360 degrees around said optical axis and in multiple directions from zero degrees along the optical axis to approximate 90 degrees measured from the optical axis;

a circular condensing lens having a center axis aligned with said optical axis and positioned apart from said LED, said condensing lens configured to receive and collimate a central cone of the light emitted from said LED, said cone of light being essentially centered around said optical axis;

a parabolic reflector having a center axis aligned with said optical axis of said LED, said parabolic reflector having a circular opening formed therethrough centered on said center axis, said opening dimensioned to allow said cone of light from said LED to pass through said parabolic reflector and impinge on said condensing lens, said parabolic reflector positioned around said LED to receive that portion of the light emitted by said LED that does not pass through said opening; said parabolic reflector configured to direct said light received from said LED in an annular beam in a direction parallel to the optical axis but in a direction away from said condensing lens;

a circular annular double bounce mirror configured and positioned to received the annular beam of light from said parabolic reflector and reverse the direction of that light 180 degrees and form in an annular collimated beam essentially parallel to said optical axis around said condensing lens;

Whereby substantially all of the light emitted by said LED is collimated into a beam of light substantially parallel to said optical axis of said LED.

2. A catadioptric light distribution system as claimed in claim 1 wherein said LED is a Lambertian pattern LED.

3. A catadioptric light distribution system as claimed in claim 1 wherein said condensing lens is positioned and has a diameter sufficient to receive a cone of light from said LED having a conical angle of between about 30 and about 50 degrees measured from the optical axis.

4. A catadioptric light distribution system as claimed in claim 1 where in said parabolic reflector is dimensioned and configured to receive a toroid of light from said LED having a toroidal angle of the difference between about 30 to about 90 degrees to the difference between about 50 to about 90 degrees measured from said optical axis.

5. A catadioptric light distribution system as claimed in claim 1 where in said circular annular double bounce mirror comprises a first circular annular mirror having, in cross section, a flat face angled at essentially 45 degrees as measured from said optical axis, said first circular annular mirror having a first interior circular edge and a first exterior circular edge, and a second circular annular mirror having a second circular interior edge joined to said first exterior circular edge of said first circular annular mirror, and a second circular exterior edge, said second circular annular mirror having, in cross section, a flat face that is at an angle of essentially 90 degrees with respect to said first circular annular mirror.

6. A catadioptric light distribution system as claimed in claim 5 wherein said circular condensing lens has a diameter and said first circular exterior edge and said second circular interior edge have a diameter that is substantially equal to said diameter of said condensing lens.

7. A catadioptric light distribution system for an automobile comprising:

a Lambertian pattern light emitting diode (LED) having an optical axis and capable of emitting light in an essentially hemispherical pattern around said optical axis;

a circular condensing lens having a focal point and a center axis aligned with said optical axis and positioned with said LED at said focal point of said condensing lens, said condensing lens configured to receive and collimate a central cone of the light emitted from said LED, said cone of light being essentially centered around said optical axis

a parabolic reflector having a focal point and a center axis aligned with said optical axis of said LED, said parabolic reflector having a circular opening formed therethrough centered on said optical axis, said opening dimensioned to allow said cone of light from said LED to pass through said parabolic reflector and impinge on said condensing lens, said parabolic reflector configured and positioned around said LED to receive that portion of the light emitted by said LED that does not pass through said opening; said parabolic reflector configured to direct said light received from said LED in an annular beam in a direction parallel to the optical axis but in a direction away form said condensing lens;

a circular annular double bounce mirror configured and positioned to received the annular beam of light from said parabolic reflector and reverse the direction of that beam of light 180 degrees and form in an annular collimated beam around said condensing lens essentially parallel to said optical axis;

Whereby substantially all of the light emitted by said LED is collimated into a beam of light substantially parallel to said optical axis of said LED.

8. A catadioptric light distribution system as claimed in claim 7 wherein said condensing lens is positioned and has a diameter sufficient to receive a cone of light from said LED having a conical angle of between about 30 and 50 degrees as measured from the optical axis.

9. A catadioptric light distribution system as claimed in claim 7 where in said parabolic reflector is dimensioned and configured to receive a toroid of light from said LED having a toroidal angle of the difference between about 30 to about 90 degrees to the difference between about 50 to about 90 degrees as measured from said optical axis.

10. A catadioptric light distribution system as claimed in claim 7 where in said circular annular double bounce mirror comprises a first circular annular mirror having, in cross section, a flat face angled at essentially 45 degrees as measured from said optical axis, said first circular annular mirror having a first interior circular edge and a first exterior circular edge, and a second circular annular mirror having a second circular interior edge joined to said first exterior circular edge of said first circular annular mirror, and a second circular exterior edge, said second circular annular mirror having, in cross section, a flat face that is at an angle of essentially 90 degrees with respect to said first circular annular mirror.

11. A catadioptric light distribution system as claimed in claim 10 wherein said circular condensing lens has a diameter and said first circular exterior edge and said second circular interior edge have a diameter that is substantially equal to said diameter of said condensing lens.

12. A catadioptric light distribution system as claimed in claim 11 wherein said parabolic reflector has an exterior diameter that is substantially the same as the diameter of said condensing lens.